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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|-----------------------------|---------------------|------------------|
| 10/088,478 | 11/12/2002 | Andrew Jonathan Turberfield | 177-386 | 2939 |
| 7590 | 06/17/2004 | | EXAMINER | |
| Nixon & Vanderhye 8th Floor 1100 North Glebe Road Arlington, VA 22201-4714 | | | MENON, KRISHNAN S | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1723 | |

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

CJ

| | | |
|------------------------------|------------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/088,478 | TURBERFIELD ET AL. |
| | Examiner Krishnan S Menon | Art Unit 1723 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 12 November 2002.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-21 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>3/20/02</u> | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-21 are pending after preliminary amendment.

Claim Objections

Claim 17 is objected to because of the following informalities: Claim 17 recites the limitation 'lost mould', a definition of which could not be found in the specification. Examiner would consider it as 'mold' for examination purpose. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-5,7-9,11,12,14,17,18, 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ehrsam et al (US 4,801,379).

Claim 1: Ehrsam teaches a method of fabricating a porous filter element comprising steps of exposing a photosensitive material to an interference pattern of e.m. radiation, exposure being varied with intensity of the interference, treating the exposed material to selectively remove regions of the material (see abstract).

Claim 2: interfering beams of electromagnetic radiation – see abstract and col 2 lines 29-44.

Claim 3: Coherence, intensity and angle selected in accordance with the desired pattern – see col 3 lines 30-62, col 4 lines 26-30

Claim 4: laser beams – see col 3 lines 38-45

Claim 5: three beams – see col 3 lines 58-62

Claim 7: regions extend from first side to second side in a straight line – see fig 1e

Claim 8: treating the exposed material comprises removing regions having exposure below the predetermined level – see col 4 line 64 – col 5 line 10.

Claim 9: regions removed comprises regions having an exposure above the predetermined level – see col 4 lines 30-43, fig 1d.

Claim 11: pattern varies through depth of the material to vary cross-section – see claim 1.

Claim 12: pattern repeats across the depth, create a regular array which extend through the depth – see fig 1a-c.

Claim 14: material is in the form of a thin film – see col 4 lines 18-29

Claim 17: treated material is a mould to form the porous element – see col 2 lines 29-44, col 4 lines 44-57.

Claim 18: voids left by selective removal filled with a material from which the filter element is formed: col 2 lines 29-44, col 4 lines 58-62

Claim 20: exposure time and intensity of the radiation is set in accordance with desired size of the regions – see col 4 lines 18-29.

Claim 21: A porous filter element made by the method – see abstract.

2. Claims 1 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 93/11861.

Claim 1: WO 93/11861 teaches a method of fabricating a porous filter element comprising steps of exposing a photosensitive material to an interference pattern of e.m. radiation, exposure being varied with intensity of the interference, treating the exposed material to selectively remove regions of the material (see page 12 lines 19-36, page 13 lines 1-9).

Claim 10: Pattern is non-varying through the depth of the material, and have constant cross section – see figures.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ehrsam (379).

Ehrsam teaches all the limitations of claim 5. Claim 6 adds further limitation of wave vectors and polarization vectors, which Ehrsam does not teach. However, they are result-effective variables that can be optimized for the interference pattern. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and

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Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); In re Aller, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955).

2. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ehrsam (379) in view of Gelorme et al (US 4,882,245).

Ehrsam teaches all the limitations of claim 1. Claim 13 adds the further limitation of the material as an epoxy and a photoacid generator. Ehrsam does not teach the photosensitive material used other than saying that it is a paint or lacquer. Gelorme teaches an epoxy and a photoacid generator for a photoresist composition Col 4 lines 3-61). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Gelorme in the teaching of Ehrsam because Ehrsam does not teach any specific photoresist material.

3. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ehrsam (379) in view of Hayes et al (US 5,296,180).

Ehrsam teaches the limitations of claim 18. Claim 19 adds the further limitation of voids filled with ceramic, then sintered to leave porous ceramic. Ehrsam teaches filling inorganic materials (col 2 lines 51-55) but is not specific about ceramic and the process of sintering. Hayes teaches that the method of manufacturing shaped ceramic materials using natural or other objects by applying ceramic on to the object and then sintering it to remove the object to make the ceramic into the shape is known (col 1 lines 9-15; col 3 lines 50-57). It would be obvious to one of ordinary skill in the art at the time of invention to use

the teaching of Hayes in the teaching of Ehrsam to make ceramic microfilters as taught by Ehrsam.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ehrsam (379) in view of Trokhan et al (US 5,895,623).

Ehrsam teaches all the limitations of claim 1. Claim 15 adds the further limitation of plurality of regions with different compositions which react differently to exposure and treatment, which is not specifically taught by Ehrsam. Trokhan teaches a process for making a foraminous member having gross foramina and fine foramina (abstract, figures), the gross foramina being produced by a photolithographic process (see col 4 lines 40-64), but the process for making the fine foramina is not described. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Ehrsam in the teaching of Trokhan to make the fine porous structure and the gross porous structure both by the process as taught by Ehrsam.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The

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fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan Menon
Patent Examiner

[Signature]
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